Tutorial on using H5RESULTS

1. Add to the Mplus input the following command and option. For example,

   SAVEDATA: H5RESULTS = results.h5;

   It is not necessary to name the file with the h5 file extension, but doing so will make it clear that the file is in Hierarchical Data Format version 5 (HDF5).

2. Run Mplus. Mplus creates the file results.h5 and saves various results in H5 format.
3. If you have not done so, download the RH5results.zip file from the Mplus website at www.statmodel.com. Uncompress the RH5results.zip file. Make note of the folder that you have extracted the files.
4. Open R. Source the results.R script file from the downloaded package.
5. In R, set source_dir to the folder containing results.R file. This is currently necessary for the script to locate the supplementary files (result_sections.csv, summary_analysis.csv, and summary_data.csv). The R functions require the rhdf5 package from Bioconductor. If the package is not already installed or loaded, the script file will automatically install and/or load the package. You may be prompted to install other dependencies required by the rhdf5 package. This step is only required the first time.
6. To view the results saved in results.h5, use the mplus.view.results() function. For example:

   ```
   > mplus.view.results('results.h5')
   ```

   This produces the following information:

   ```
   Use the following functions to view the available results.

    - Input instructions
       - mplus.print.input.instructions
    - Summary of Analysis
       - mplus.print.summary.analysis
    - Model Fit Information
       - mplus.print.model.fit.information
    - Model Results
       - mplus.print.model.results
    - Confidence Intervals of Model Results
       - mplus.print.confidence.intervals
    - Standardized Model Results
       - mplus.print.standardized.model.results
    - Confidence Intervals of Standardized Model Results
       - mplus.print.standardized.confidence.intervals
    - R-Square
       - mplus.print.rsquare
    - Model Modification Indices
       - mplus.print.model.modification.indices
   ```

   These functions can be used to put the corresponding Mplus results or information into an R data frame.

The following are descriptions about available functions, including the type of R structure.

function: mplus.print.input.instructions
output: Returns the Input Instructions
argument(s): Name of the H5 file
return type: List of character string
example:

```
> mplus.print.input.instructions('ex3.1results.h5')
TITLE:    this is an example of a simple linear
regression for a continuous observed
dependent variable with two covariates
DATA:     FILE IS ex3.1.dat;
FORMAT IS 3(F12.6,1X);
VARIABLE: NAMES ARE y1 x1 x3;
USEVAR are Y1 X1 X3;
DEFINE:
MODEL:    y1 ON x1@3 x3;
x1 with x3;

OUTPUT: STAND CINT MOD(0);

SAVEDATA: H5RESULTS = ex3.1results.h5;
```

function: mplus.print.summary.analysis
output: Returns the Summary of Analysis
argument(s): Name of the H5 file
return type: List of character string
example:

```
> mplus.print.summary.analysis('ex3.1results.h5')
Summary of Analysis
Number of groups:  1
Number of observations:  500
Number of dependent variables:  1
Number of independent variables:  2
Number of continuous latent variables:  0
Estimator:  ML
Information matrix:  OBSERVED
Maximum number of iterations:  1000
Convergence criterion:  5.000000e-05
Maximum number of steepest descent iterations:  20
Input data file(s)
  Input data format:  (3(F12.6,1X))
  Data files:  ex3.1.dat
Observed dependent variables
  Continuous:  Y1
Observed independent variables
  Observed independent variables[1]:  X1
  Observed independent variables[2]:  X3
```

function: mplus.print.model.fit.information
output: Returns the Model Fit Information
argument(s): Name of the H5 file
return type: 2-column data frame; headers (description, value)
example:

```
> mplus.print.model.fit.information('ex3.1results.h5')
```

```
                                    description         value
1                         Number of Free Parameters  8.000000e+00
2                                   H0 Loglikelihood -2.563262e+03
3                                   H1 Loglikelihood -2.124388e+03
4                                       Akaike (AIC)  5.142524e+03
5                                     Bayesian (BIC)  5.176241e+03
6                          Sample-Size Adjusted BIC  5.150849e+03
7                                 Chi-square : Value  8.777482e+02
8                    Chi-square : Degrees of Freedom  1.000000e+00
9                           Chi-square : P-Value  0.000000e+00
10                              RMSEA : Estimate  1.324196e+00
11                                RMSEA : Low CI  1.251391e+00
12                               RMSEA : High CI  1.398512e+00
13                            RMSEA : Probability  2.288655e-08
14                                           CFI  0.000000e+00
15                                           TLI  0.000000e+00
16             Chi-square for Baseline Model : Value  4.695846e+02
17 Chi-square for Baseline Model : Degrees of Freedom  2.000000e+00
18            Chi-square for Baseline Model : P-Value  0.000000e+00
19                                          SRMR  1.846677e+00
```

function: mplus.print.model.results
output: Returns the Model Results
argument(s): Name of the H5 file
return type: Data frame; varying number of columns matching the Mplus output
example:

```
> mplus.print.model.results('ex3.1results.h5')
             Section  Statement     Estimate       S.E. Estimate/S.E. Two-Tailed P-Value
1                      Y1 ON X1  3.000000000 0.00000000  999.00000000       9.990000e+02
2                      Y1 ON X3  0.589028597 0.10670053    5.52039051       3.382471e-08
3                    X1 WITH X3  0.028186413 0.04575988    0.61596352       5.379182e-01
4              Means          X1  0.001289014 0.04676513    0.02756357       9.780102e-01
5              Means          X3 -0.042161230 0.04374420   -0.96381319       3.351396e-01
6         Intercepts          Y1  0.505761385 0.10446616    4.84138918       1.289346e-06
7          Variances          X1  1.093488574 0.06915610   15.81188965       0.000000e+00
8          Variances          X3  0.956777275 0.06051174   15.81143093       0.000000e+00
9 Residual Variances          Y1  5.446470737 0.34446973   15.81117439       0.000000e+00
```

There are functions corresponding to other sections of the Mplus output similar to the function for the MODEL RESULTS section. These functions are: mplus.print.confidence.intervals, mplus.print.standardized.model.results, mplus.print.standardized.confidence.intervals, mplus.print.rsquare, mplus.print.model.modification.indices, mplus.print.irt.parameterization, mplus.print.results.in.probability.scale, mplus.print.logistic.regression.odds.ratio.results, mplus.print.confidence.intervals.in.probability.scale, mplus.print.latent.class.indicator.odds.ratios, and mplus.print.brant.wald.test.